

G-9

Does Financial Education Affect Knowledge, Attitudes, and Behavior? An Empirical Analysis

John E. Grable¹ and So-hyun Joo²

Research has shown that poor personal financial management attitudes and behaviors can lead to lower financial wellness. This research was designed to examine the empirical relationship between financial education and financial knowledge, attitudes, and behaviors. Using quasi-experimental research methods (N = 75), this study showed statistically significant relationships between (a) financial education and risk tolerance, (b) financial education and financial knowledge, and (c) financial education and savings/investment behavior. Based on the research findings, the potential positive effects of financial education and long-term returns on educational investment were identified.

Introduction

The fact that poor personal financial management attitudes and behaviors can lead to lower financial wellness is well known by researchers, practitioners, and educators. This is the reason that so many financial planners, counselors, and educators continue to encourage people to participate in financial education workshops. It is also the reason planners, counselors, and educators urge people to start saving for retirement and financial emergencies at early ages. Quite a few illustrations exist that show how taking a proactive approach to financial planning and counseling issues positively impacts the level of living of individuals in later life stages (e.g., O'Neill, 1996).

Although financial planning educators already know that proactive financial education is effective in changing knowledge, attitudes, and behaviors, it is still difficult to convince employers, employees, and policy makers that financial education works because, in part, most research on the subject is polemic in nature. This simply means that the available literature that supports the use of financial education in changing knowledge, attitudes, and behaviors tends to be descriptive rather than inferential (i.e., empirically based), and as such, there is

little statistical precision in the argument that "financial education works."

It has been widely reported that Americans lack the necessary financial preparedness for retirement and other financial events (e.g., 1997 Retirement Confidence Survey; Atchley, 1998; Joo, 1998). As has been argued at Personal Finance Employee Education conferences and through affiliated publications, this weakness in financial preparedness is a growing concern for employers as well as employees because poor personal financial behaviors tend to adversely affect employee performance (Garman, Leech, & Grable, 1996; Joo, 1998; Joo & Garman, 1998). The question that still remains to be thoroughly answered is "does financial education really work?" In other words, does financial education really change a person's financial knowledge, attitudes, and behaviors? Also of importance is understanding what statistical relationships exist between and among financial education and knowledge, attitudes, and behaviors of individuals? It is important to note that until the advent of the Personal Finance Employee Education initiative, little empirical testing (i.e., applying rigorous statistical methods to obtained data) of the extent to which financial education actually correlates with financial planning behaviors and choices had been conducted.

¹ Professor, Texas Tech University, Box 41162, Lubbock TX 79409-1162. Phone: (806) 742-3050. E-mail: jgrable@hs.ttu.edu

² Professor, Center for Financial Responsibility, Texas Tech University, and Research Affiliate, Personal Finance Employee Education, Center for Organizational and Technological Advancement, Virginia Tech. MEDCE Department, Box 41162, Lubbock TX 79409-1162. Phone: (806) 742-3050. E-mail: sjoo@hs.ttu.edu

The purpose of this paper is to move beyond pure theory development or the simple presentation of descriptive statistics relating to financial education, and instead present the statistical results of a quasi-experimental study designed to quantify whether financial education has a positive impact in changing financial knowledge, attitudes, and behaviors. Specifically, four research questions were developed and tested. These questions included (a) what impact does financial education have on financial risk-taking attitudes? (b) what impact does financial education have on financial knowledge? (c) what impact does financial education have on economic expectations? and (d) what impact does financial education have on savings/investment behavior? This paper adds to the growing body of literature that argues for increased financial education directed at all Americans, regardless of age, gender, or employment classification, to help improve financial wellness through changing financial knowledge, attitudes, and behaviors.

Background Review

The concept that education is associated with an increased awareness of financial issues is supported in the literature. As far back as 1974, Baker and Haslem determined that investors with less education found investment price stability more important than those with at least some college training. During the past decade, other researchers have also concluded that someone's level of education appears to be an important factor associated with overcoming barriers to owning risky assets and taking risks (Haliassos & Bertaut, 1995; Lee & Hanna, 1995; Masters, 1989; Shaw, 1996; Sung & Hanna, 1996; Zhong & Xiao, 1995).

In addition to attained educational levels, researchers continue to find that increased levels of financial knowledge lead to increased confidence in risk taking and financial planning behaviors (e.g., Grable & Joo, 1997; Sung & Hanna, 1996). What is of interest to readers of this journal, however, is addressing how personal finance employee educators can help increase someone's level of financial knowledge, attitudes, and behaviors? The answer is simple: financial education — either formal training or through professionally developed and presented

workshops (Garman, 1997, 1998; Joo, 1998; Wallace & Karlak, 1997; Wechsler, 1997).

Literature that reports empirical findings of the effects of financial education on actual knowledge, attitudes, and behaviors is scarce. Most of the literature simply shows behavioral changes in terms of descriptive statistics or estimates based on personal experience. Also, many studies have based behavioral change conclusions on limited samples and by measuring limited financial behaviors, such as the making of a retirement contribution. For example, a survey by National Family Opinion Research, Inc. for American Express Financial Advisors used percentage changes to suggest that an increase in participation in defined benefit plans was due to financial education (Gorbach, 1997). Additionally, Di Paula (1998), Fletcher, Beebout, and Mendenhall (1997), Pippidis and Wallace (1998), and the Retirement Confidence Survey (1997) used descriptive statistics to conclude that financial education workshops influenced individual retirement knowledge, attitudes, and behaviors. Myers and Stamper (1998) also used percentage change figures to report that financial education improved financial well being of military personnel.

While these, and other, studies are invaluable in describing and highlighting the success of financial education, these studies often suffer from a lack of rigorous testing of data. One recent attempt at statistically testing the results of financial education was undertaken and reported by Bernheim, Garrett, and Maki (1997). Bernheim and his associates provided the first systematic evidence on the long-term behavioral effects of high school financial curriculum mandates. They concluded that high school curriculum mandates that required financial education for public school children significantly increased exposure to financial education and elevated the rates of savings and wealth accumulation of students over time above those students who were not subject to mandatory financial education. Bernheim et al. argued that "education may be a powerful tool for stimulating personal saving" (see Web site). Other researchers, such as Kratzer, Brunson, Garman, Kim and Joo (1998) have taken steps to empirically test the impact of financial education on knowledge, attitudes, and behaviors, but to

date, this type of research has not occurred in sufficient volume.

Summary of Literature

As shown in this brief review of the previous literature, the potential effects of financial education are substantial, however, there still is a lack of empirically based inferential research that has examined evidence of the effects of financial education. The need exists for focused research aimed at examining the effects of financial education on financial knowledge, attitudes, and behaviors. Also, research is needed to explore the effects of financial education on other areas of life such as productivity, family relationships, financial lifestyle satisfaction, and determinants of financial education participation.

Methodology

The intent of the present study was to expand on Bernheim et al.'s (1997) findings by examining the possible effects of financial education on financial attitudes, especially risk tolerance, financial knowledge, and financial behaviors such as savings and investing. A quasi-experimental design method (i.e., non-random selection and assignment of participants and no control group) was used to assess the impact of education on financial knowledge, attitudes, and behaviors. The participants ($N = 75$) were 50 female and 25 male students enrolled in a 15 week financial planning course taught by a Certified Financial Planner. Participants' ages ranged from 18 to 54 ($M = 21$ years of age). Participants who took part in the study volunteered as an in-class exercise. The participants were given extra credit for their participation and treated in accordance with the "Ethical Principles of Psychologists and Code of Conduct" (American Psychological Association, 1992).

Procedure

At the beginning of the course, participants were to asked to voluntarily participate in a pre-test experiment by completing a questionnaire developed to assess a respondent's financial risk tolerance, financial knowledge, economic expectations, and savings/investing behavior. The Grable and Lytton financial risk-tolerance instrument (an interval scale) was used to assess financial risk-taking attitudes (see Grable, 1998). Questions related to financial knowledge and

economic expectations were similar to items found in the Survey of Consumer Finances. These series of questions were measured at the interval level. Savings and investing behavior questions were similar to ones developed by staff at the Center for Financial Responsibility at Texas Tech University (1998). Behavioral responses were measured at the nominal level. No specific mention of the results of the pre-test were provided to the class, and no special effort was made to "teach to the test" during the term of the course. In other words, at no time did the instructor spend more than a few minutes during the course discussing financial risk tolerance, knowledge, expectations, or changes in financial planning behaviors. During the last day of class a post-test was delivered to participants. The post-test contained the same questions, in the same order, excluding demographic assessments. The post-test also included volunteered assessments of the class content and each respondent's rating of the class.

Research Hypotheses

Four null-hypotheses were developed from the research questions presented in the introduction. These included:

1. There is no difference in mean financial risk-taking attitudes among participants as a result of financial education.
2. There is no difference in mean financial knowledge among participants as a result of financial education.
3. There is no difference in mean economic expectations among participants as a result of financial education.
4. There is no relationship between what participants planned to put into savings/investment alternatives and financial education.

Results

The participants of this research provide a useful sample for the study of educational effects on financial knowledge, attitudes, and behaviors. Approximately 67% of participants were female. The average age of participants was 21.11 years, with a median age of 20 years. Almost 97% were enrolled in school full-time, with about half (52%) being juniors or seniors and the remainder (48%) being freshmen or sophomores. The majority of participants were single (92%) while

8% were married. Income for participants ranged from zero to \$27,000 per year ($M = \$5,203$). The low mean income reported was a result of 45% of participants not being employed. Based on the pre-test results, it was determined that the average participant had a moderate amount financial risk tolerance, a vague notion about financial terms and practices, and an expectation that the economy would perform about the same or slightly worse in the next five years.

In terms of savings, 79% of participants indicated having a savings account in their own name, while 85% indicated having a checking account. The average cash balance in participants' savings accounts was \$300. Sixty-one percent of participants indicated owning another type of financial asset, such as an EE Savings bond, mutual fund, or collectible. Results from the pre-test indicated that only 40% of participants planned to put additional money into assets besides savings and checking accounts.

Table 1 presents results from three t-tests. T-tests were used to address the first three null-hypotheses by comparing the mean scores of participants in the pre- and post-tests. The first column indicates the hypothesis being tested. The second and third columns present the mean and standard deviation scores for participants in the pre-tests. The fourth and fifth columns present the mean and standard deviation scores for participants in the post-test. The final two columns indicate the calculated t-values and significance probabilities.

Table 1
T-test Results for Pre- and Post-test Participants

Hypotheses	Mean Pre- Test	SD Pre- Test	Mean Post- Test	SD Post- Test	t value	Sig.
Risk Tolerance	35.77	6.40	39.48	4.98	-3.96	.001
Knowledge	2.15	.85	2.80	.74	-5.04	.001
Economic Expectations	1.89	.71	1.97	.77	-.66	.509

Since the t-test compares means (not standard deviations), each t value resulted from a comparison of the two mean scores on the same row. For example, the t of -3.96 in the first row involved a comparison of 35.77 and 39.48. The

post-test mean score was found to be statistically significantly different (i.e., greater) than the pre-test score. In summary, a significant difference was found between the pre- and post-test means for risk-tolerance scores and financial knowledge scores. The post-test scores of risk-tolerance and financial knowledge for the participants were higher than the pre-test scores. These findings indicate a positive relationship between (a) financial education and risk tolerance and (b) financial education and financial knowledge. However, no significant difference was found between economic expectations scores, indicating that participants expected the economy to do about the same or slightly worse in the next five years. In terms of the null-hypotheses, hypotheses one and two were rejected, while no evidence was found to reject hypothesis three.

A chi-square test was used to test hypothesis number four. A chi-square test is the most frequently reported nonparametric test when a researcher is interested in assessing relationships between responses that fall into two or more categories. This test determines whether a significant difference exists between an observed number and an expected number of responses falling in each category. In effect, this statistical test helps determine whether or not responses are significantly different from what might be expected by chance.

Table 2 indicates the number of participants indicating a plan to purchase assets other than savings or checking accounts over the next year from the pre- and post-test. For participants in the pre-test, 45 (60%) indicated that they planned to make purchases in the following year while 30 (40%) did not. Results from the post-test indicated that 63 (84%) were planning to make a purchase in the upcoming year with only 12 (16%) not planning a purchase. The chi-square analysis revealed that significantly more participants planned to purchase a non-savings or checking account asset (i.e., a risky asset such as stock, bond, or mutual fund) during the upcoming year after receiving financial education ($X^2 = 10.71, p < .001$).

Table 2
Chi-Square Results of the Impact of Financial Education of Investment Plans

	Do Not Plan To Invest	Plan To Invest	Row Total
Pre-Test	30	45	75
Post-Test	12	63	75
Column Total	42	108	150

$$\chi^2 = 10.71, p < .001$$

Conclusions

The results of this study add to the existing body of knowledge by offering an insight into the role that financial education plays in shaping knowledge, attitudes, and behaviors. Findings showed that financial education does have a positive impact on (a) risk-taking attitudes, (b) financial knowledge, and (c) financial behaviors. Respondents' risk-tolerance level was significantly increased after financial education. Respondents' financial knowledge level also was significantly increased by financial education. However, financial education did not have an impact on the economic expectations of participants.

These findings also support previous research that financial education positively changes financial behaviors (Bernheim & Garrett, 1996; Di Paula, 1998; Fletcher et al., 1997; Gorbach, 1997; Heath, 1996; Myers & Stamper, 1998). However, this research was different in one critical way, namely, the statistical significance of changing financial knowledge, attitudes, and behaviors, through the delivery of financial education, was measured empirically.

Implications

Previous research indicates that individuals who have more financial knowledge and greater financial risk tolerance tend to have a common psychological profile that enables them to make changes in their financial lives more easily than others (DeVaney & Su, 1997; Grable & Lytton, 1997; Sung & Hanna, 1996; Weagley & Moore, 1997). Research conducted by others in the past also indicates that the single best method for increasing risk-tolerance attitudes, financial knowledge, and changing financial behaviors is through carefully administered financial educational methods (Bernheim et al., 1997; Garman, 1997). The results of this study support

this general theme. More specifically, based on findings from the t-tests and chi-square analysis, one can argue that financial education does, in fact, have a positive impact on risk-tolerance attitudes, financial knowledge, and behaviors. It is, therefore, of little surprise that participants in the study overwhelmingly changed their anticipated financial behavior in the post-test by indicating a willingness and desire to purchase other assets besides savings and checking accounts in the upcoming year. For example, the vast majority of participants indicated the willingness and anticipation of purchasing shares in a riskier financial vehicle, such as a stock mutual fund after the course. Other participants indicated, through personal follow-up interviews, that they were able to apply their new financial knowledge when purchasing homes, paying down debt, and making other investments decisions.

These findings have immediate and powerful implications for personal finance employee educators, researchers, and policy makers. For example, suppose participants act on their expectations of purchasing risky assets account by moving their average cash balance (i.e., \$300) into equity mutual funds. Instead of earning, on average, 3% annually, participants would now be earning, on average, 12% annually (Gitman & Joehnk, 1999).

Table 3 indicates the future value projections of this new savings behavior that would result from financial education. For example, the table shows that for those participants who indicate a willingness to move into more risky securities, such as mutual funds, using their available cash balance from their savings account, stand to significantly outperform those participants who might be unwilling to move into more risky investments. Simply by investing the cash balance in an equity mutual fund, a participant would have, after 20 years, done five times better than a participant who remained invested in a bank account (Table 3). In other words, the direct dollar cost benefit of financial education, as applied to the participants of this study, is \$2,352 over the course of 20 years.

Table 3
Future Value Comparisons

	Cash Balance Earning 3% Annually	Cash Balance Earning 12% Annually
Beginning Balance	\$300	\$300
End of Year 1	\$309	\$336
End of Year 3	\$328	\$421
End of Year 5	\$348	\$529
End of Year 10	\$403	\$932
End of Year 15	\$467	\$1,642
End of Year 20	\$542	\$2,894

This simple illustration of future value estimation implies that huge potential positive outcomes for individuals can be obtained through financial education. Suppose, for example, that instead of having a \$300 cash balance, a person had a \$10,000 balance. At the end of 20 years this person's balance would be worth a little more than \$96,000 compared to about \$18,000 in a savings account. The cost effectiveness of financial education on changing financial behaviors is seen by comparing the cost of education — \$200 in this case, which was the approximate cost of the course used as the basis of this study — to the outcome of education. In the most conservative estimate from this study, the net benefit offered by financial education is in excess of \$2,500 over 20 years, and more than \$96,000 over the same period of time for someone starting with \$10,000. In summary, financial education not only works it pays dividends. Financial education (a) increases people's willingness to take financial risks, (b) enhances a person's knowledge of financial situations, and (c) increases the likelihood that a person will take positive steps in changing their financial behavior.

Recommendations For Further Research

Obviously the findings reported in this paper offer only a glimpse into the impact financial education can play in changing knowledge, attitudes, and behaviors. Research findings from this study suggest that more research is needed to examine the effects of financial education on financial knowledge, attitudes, and behaviors. Ultimately, what is needed is a conceptual model that describes the multiple relationships between and among education, knowledge, attitudes, and behaviors. Such a model should incorporate the direct and indirect impacts of financial education

on such matters. This study provides a rough starting point for the development of such a model. Research based on a thorough theoretical background is also needed; as is more empirical testing that utilizes a broad range of samples and various financial education delivery methods.

Even though this research has limitations on generalizing the results to the public at large, the findings offer significant insights for use by financial planning practitioners, educators, and researchers. For instance, the possible background mechanism of behavioral changes due to financial education could be due to changes in risk tolerance, attitudes, and/or financial knowledge. Interdisciplinary research that incorporates the psychological processing of behavioral changes must be undertaken, and the best place to conduct such studies is in the workplace because the workplace offers an environment of reality that cannot be found in purely academic settings. Once the reasons and processes of behavioral changes are identified, practitioners, educators, and researchers can move to develop more effective financial education programs. In other words, the best way to validate the effectiveness of financial education, and thereby increase the use of financial education throughout society, is by combining the competencies of personal finance employee educators and academic researchers in conducting empirical studies. Such collaborative efforts will lead naturally to the finest educational material available.

References

- American Psychological Association. (1992). Ethical principles of psychologists and code of conduct. *American Psychologist*, 47, 1597-1611.
- Atchley, R. C. (1998, January). Educating the public about personal finance: A call for action. *Journal of the American Society of CLU & ChFC*, 28, 30-32.
- Baker, H. K., Haslem, J. A. (1974). The impact of investor socioeconomic characteristics on risk and return preferences. *Journal of Business Research*, 2, 469-476.
- Bernheim, B. D., & Garrett, D. M. (1996, March). *The determinants and consequences of financial education in the workplace: Evidence from a survey of*

households. Stanford Economics Working Paper #96-007.

Bernheim, B. D., Garrett, D. M., & Maki, D. M. (1997). *Education and saving: The long-term effects of high school financial curriculum mandates*. [Article posted on the World Wide Web]. Retrieved January 5, 1998 from the World Wide Web, <http://www-econ.stanford.edu/econ/wprkp/swo97012.html>

Center for Financial Responsibility. (1998). [Retirement issues and trends]. Unpublished raw data and analysis, Texas Tech University.

DeVaney, S. A., & Su, Y. (1997). Gender differences in retirement planning knowledge. In E. T. Garman, J. E., Grable, & S. Joo (Eds.). *Personal Finances and Worker Productivity 1* (1) (pp.160-171). Roanoke, VA.

Di Paula, R. (1998). From the cream of retirement to the reality of integrating financial education with employee benefit services. In E. T. Garman, S. Joo, I. E. Leech, & D.C. Bagwell (Eds.). *Personal Finances and Worker Productivity 2* (1) (pp.149-151). Roanoke, VA.

Fletcher, C. N., Beebout, G., & Mendenhall, S. (1997). Developing and evaluating personal finance education at the worksite: A case study. In E. T. Garman, J. E., Grable, & S. Joo (Eds.). *Personal Finances and Worker Productivity 1* (1) (pp.54-59). Roanoke, VA.

Garman, E. T. (1997). *Financial education: A "must" employee benefit to remain competitive*. Unpublished manuscript. Blacksburg, VA.

Garman, E. T. (1998). The business case for financial education – Personal financial wellness and employee productivity. In E. T. Garman, S. Joo, I. E. Leech, & D.C. Bagwell (Eds.). *Personal Finances and Worker Productivity 2* (1) (pp.81-93). Roanoke, VA.

Garman, E. T., Leech, I. E., & Grable, J. E. (1996). The negative impact of employee poor personal financial behaviors on employers. *Financial Counseling and Planning*, 7, 157-168.

Gitman, L. J., & Joehnk, M. D. (1999). *Fundamentals of Investing*. Reading, MA: Addison-Wesley.

Gorbach, T. R. (1997). A case for comprehensive financial education in the workplace. In E. T. Garman, J. E., Grable, & S. Joo (Eds.). *Personal Finances and Worker Productivity 1* (1) (pp.66-70). Roanoke, VA.

Grable, J. E. (1998). Financial risk tolerance and additional factors with affect risk taking in everyday money matters. *Journal of Business and Psychology* (in press).

Grable, J. E., & Joo, S. (1997). Determinants of risk preference: Implications for family and consumer science professionals. *Family Economics and Resource Management Biennial*, 2, 19-24.

Grable, J. E., & Lytton, R. H. (1997). Determinants of retirement savings plan participation: A discriminant analysis. In E. T. Garman, J. E., Grable, & S. Joo (Eds.). *Personal Finances and Worker Productivity 1* (1) (pp.184-189). Roanoke, VA.

Haliassos, M., & Bertaut, C. C. (1995). Why do so few hold stocks? *The Economic Journal*, 105, 1110-1129.

Heath, E. T. (1996). Do retirement preparation programs improve the retirement experience? *Benefit Quarterly*, 12 (2), 40-44.

Joo, S. (1998). *Personal financial wellness and worker job productivity*. Unpublished doctoral dissertation. Virginia Polytechnic Institute and State University, Blacksburg.

Joo, S., & Garman, E. T. (1998). The potential effects of workplace financial education based on the relationship between personal financial wellness and worker job productivity. In E. T. Garman, S. Joo, I. E. Leech, & D.C. Bagwell (Eds.). *Personal Finances and Worker Productivity 2* (1) (pp.163-174). Roanoke, VA.

Kratzer, C. Y., Brunson, B. H., Kim, J., Garman, E. T., & Joo, S. (1998). The need to increase participation in workplace education. In E. T. Garman, S. Joo, I. E. Leech, & D.C. Bagwell (Eds.). *Personal Finances and Worker Productivity 2* (1) (pp.183-185). Roanoke, VA.

Lee, H. K., & Hanna, S. (1995). Empirical patterns of risk-tolerance. *Proceedings of the Academy of Financial Services*.

Masters, R. (1989, July). Study examines investors' risk-taking propensities. *The Journal of Financial Planning*, 2, 151-155.

Myers, M. E., & Stamper, R. (1998). Fort Hood, Texas: Partners in financial readiness. In E. T. Garman, S. Joo, I. E. Leech, & D.C. Bagwell (Eds.). *Personal Finances and Worker Productivity 2* (1) (pp.144-148). Roanoke, VA.

O'Neill, B. (1996). Baby boomers at mid-life: Financial planning for 2000 and

beyond. *Journal of Family and Consumer Sciences*, 88 (4), 3-8.

Pippidis, M. R., & Wallace, N. (1998). Personal finance employee education at the University of Delaware. In E. T. Garman, S. Joo, I. E. Leech, & D.C. Bagwell (Eds.). *Personal Finances and Worker Productivity 2* (1) (pp.128-132). Roanoke, VA.

Shaw, K. L. (1996). An empirical analysis of risk aversion and income growth. *Journal of Labor Economics*, 14, 626-653.

Sung, J., & Hanna, S. (1996). Factors related to risk-tolerance. *Financial Counseling and Planning*, 7, 11-20.

The 1997 retirement confidence survey. (1997). Employee Benefit Research Institute, Mathew Greenwald & Association, and American Savings Education Council.

Wallace, P. S. & Karlak, J. M. (1997). The argument for employer sponsored financial education for employees. In E. T. Garman, J. E., Grable, & S. Joo (Eds.). *Personal Finances and Worker Productivity 1* (1) (pp.23-29). Roanoke, VA.

Weagley, R. O. & Moore, D. B. (1997). Employee benefits: Knowledge and satisfaction. In E. T. Garman, J. E., Grable, & S. Joo (Eds.). *Personal Finances and Worker Productivity 1* (1) (pp.150-159). Roanoke, VA.

Wechsler, M. (1997). Creating behavioral change: Motivating employees to plan, save, and invest for the future. In E. T. Garman, J. E., Grable, & S. Joo (Eds.). *Personal Finances and Worker Productivity 1* (1) (pp.94-98). Roanoke, VA.

Zhong, L. X., & Xiao, J. J. (1995). Determinants of family bond and stock holdings. *Financial Counseling and Planning*, 6, 107-114.